DETAILED ACTION

The response filed 3/18/11 to the Office action has been entered. Claims 1, and 3-11 are pending.

1. The rejection of claims 3-11 under 35 U.S.C. §112, first paragraph is withdrawn because of the amendment of the claims.

2. Claims 1 and 3-5 remain rejected under 35 U.S.C. 103(a) as being unpatentable over Herman et al. (5,786146, issued July 28, 1998) in view of Gerdes et al. (6,291,166, issued Sep. 18, 2001).

Herman et al. disclose a methylation specific PCR (See the Abstract). The method involves the step of conversion cytosine to uracil. Bisulfite modification includes denaturing DNA by NaOH, incubating the nucleic acid in the presence of sulfite ions, binding the deaminated nucleic acid to a solid phase. Modified DNA was purified. Modification was completed by NaOH treatment, followed by ethanol precipitation (See column11, lines 15-28).

Herman et al. do not disclose that a nucleic acid is bound to a solid phase and then the nucleic acid is deaminated.

Gerdes et al. disclose a method of using solid phases to irreversibly capture RNA or DNA and teaches true, direct solid phase manipulation and analyses including enzyme recognition, hybridization and amplification (see column 3, lines 39-49, column 4, and lines 45-48).

One of ordinary skill in the art would have been motivated to apply a solid phase bound DNA as taught by Gerdes et al. in the method of Herman et al. because as taught by Gerdes et al. a solid phase bound nucleic acid can be directly and conveniently manipulated (see column 4, lines 45-46) and can be applied in various ways for example

treating/manipulating/analyzing/amplifying nucleic acids (see column 4, lines 43-48). It would have been prima facie obvious to use solid phase bound nucleic acid as recited in the instant claims.

The response argues that the cited references fail to teach deamination of a nucleic acid bound to a solid support and the types of solid phase manipulations in the teachings of Gerdes et al. are very different than deamination, particularly they do not involve chemical alteration of nucleic acid. However, although Gerdes et al. do not explicitly disclose deamination of a nucleic acid bound to a solid support, Gerdes et al. disclose that the solid phase bound nucleic acid can be directly manipulated by enzyme, hybridization, and/or amplification reactions (see column 4, lines 45-48). Enzymatic, hybridization, and amplification reactions are various types of chemical modifications of nucleic acid molecules.

The response further argues that the Declarations of Dr. Markert-Hahn and Dr. Matthias Ballhause provide reasons that one of skill in the art would not expect to be able to perform deamination on solid phase-bound nucleic acids. It is argued that solid phase-bound nucleic acid as taught by Gerdes et al. would not be able to participate in hybridization reactions and thus could not interact properly with bisulfite ions to undergo deamination. However, these opinions are not supported by any scientific evidence.

The response also argues that Gerdes et al. teaches away from the presently claimed methods because nucleic acid may be bound to a solid phase in single-stranded form by adjusting conditions to an alkaline pH or high chaotropic salt conditions, while bisulfite conversion as instantly claimed is performed in acidic conditions. However, the instantly claimed method does

not require a particular pH for immobilization or bisulfite treatment. The limitations discussed herein are not in the claims.

The response discusses the conditions for binding DNA to solid phase via electrostatic interaction, and the binding strength between nucleic acid and a solid phase related to the length of the nucleic acid molecule as taught in Gerdes et al. These limitations are not required in the instantly claimed invention.

Based upon the analysis above, the rejection is maintained.

3. Claims 6-11 remain rejected under 35 U.S.C. 103(a) as being unpatentable over Herman et al. (5,786146, issued July 28, 1998) in view of Gerdes et al. (6,291,166, issued Sep. 18, 2001) as applied to claims 1 and 3-5 above, and further in view of Weindel et al. (WO 01/37291, issued May 21, 2001).

The teachings of Herman et al. and Gerdes et al. are set forth in section 2 above.

Herman et al. do not disclose that the solid phase comprises magnetic glass particle, the magnetic particle has diameter between 0.5 and 5um, and the magnetic glass particle is manufactured by the sol-gel method.

Weindel et al. disclose that magnetic glass particles can be used in nucleic acid purification (See the abstract). The magnetic glass particle is a solid dispersion of small magnetic core in glass (See pg. 4, lines 9-11). The diameter of the particle is between 5 and 500nm (See pg. 4, lines 21-23 and pg. 5, lines 13-23). The magnetic glass particle is used in nucleic acid purification from a sample containing cells. The advantage of this is its potential simplicity and high sensitivity (See pg. 17, lines 1-7). Weindel et al. also disclose a method of making the magnetic glass particles by the sol-gel method and spray-drying as recited in instant claim 11

(See pg. 9, lines 13-37, pg. 21 and fig. 1). The magnetic glass particle is also used in nucleic acid amplification and hybridization assay (See pg.1).

One of ordinary skill in the art would have been motivated to apply the magnetic glass particle of Weindel et al. in the method of Herman et al. as a solid support for converting cytosine bases to uracil bases because of the advantage of using the magnetic glass particle (See pg. 17, lines 1-17). It would have been prima facie obvious to apply a magnetic glass particle for the conversion of cytosine bases to uracil bases in a nucleic acid.

The response does not have specific argument for this rejection. With the same reasons as set forth above, the rejection is maintained.

Summary

4. No claims are free of the prior art.

5. THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

4. Any inquiry concerning this communication or earlier communications from the examiner should be directed to JOYCE TUNG whose telephone number is (571)272-0790. The examiner can normally be reached on Monday - Friday, 8:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gary Benzion can be reached on 571 272-0782. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Joyce Tung/
Examiner, Art Unit 1637
May 28, 2011

/Kenneth R Horlick/
Primary Examiner, Art Unit 1637